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Oh

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[54] **CONNECTOR FOR METAL RIBBED PIPE**

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[51] **Int. Cl.**[7] **F16L 17/00**

[52] **U.S. Cl.** **285/354**; 285/353; 285/903

[58] **Field of Search** 285/903, 353

[56] **References Cited**

U.S. PATENT DOCUMENTS

4,437,691	3/1984	Laney	285/353
4,674,775	6/1987	Tajima	285/903
4,801,158	1/1989	Gomi	285/903
4,904,002	2/1990	Sasa	285/903
5,713,607	2/1998	Webb .	
5,746,454	5/1998	Webb .	
5,799,834	9/1998	Small et al. .	
5,806,166	9/1998	Fuser .	
5,857,716	1/1999	Thomas	285/903

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[57] **ABSTRACT**

A connector for a metal ribbed pipe comprises a ribbed pipe, an adapter having a protrusion and connecting with a fluid receiving apparatus, a plurality of inserts having a recess contacting to the protrusion and having a collar opposite to the recess, a sleeve fitted on the collar, and a nut for assembling the sleeve with the adapter. Due to the close contact between the protrusion and the recess, the connecting end of the ribbed pipe flares in to achieve a tight seal.

1 Claim, 5 Drawing Sheets

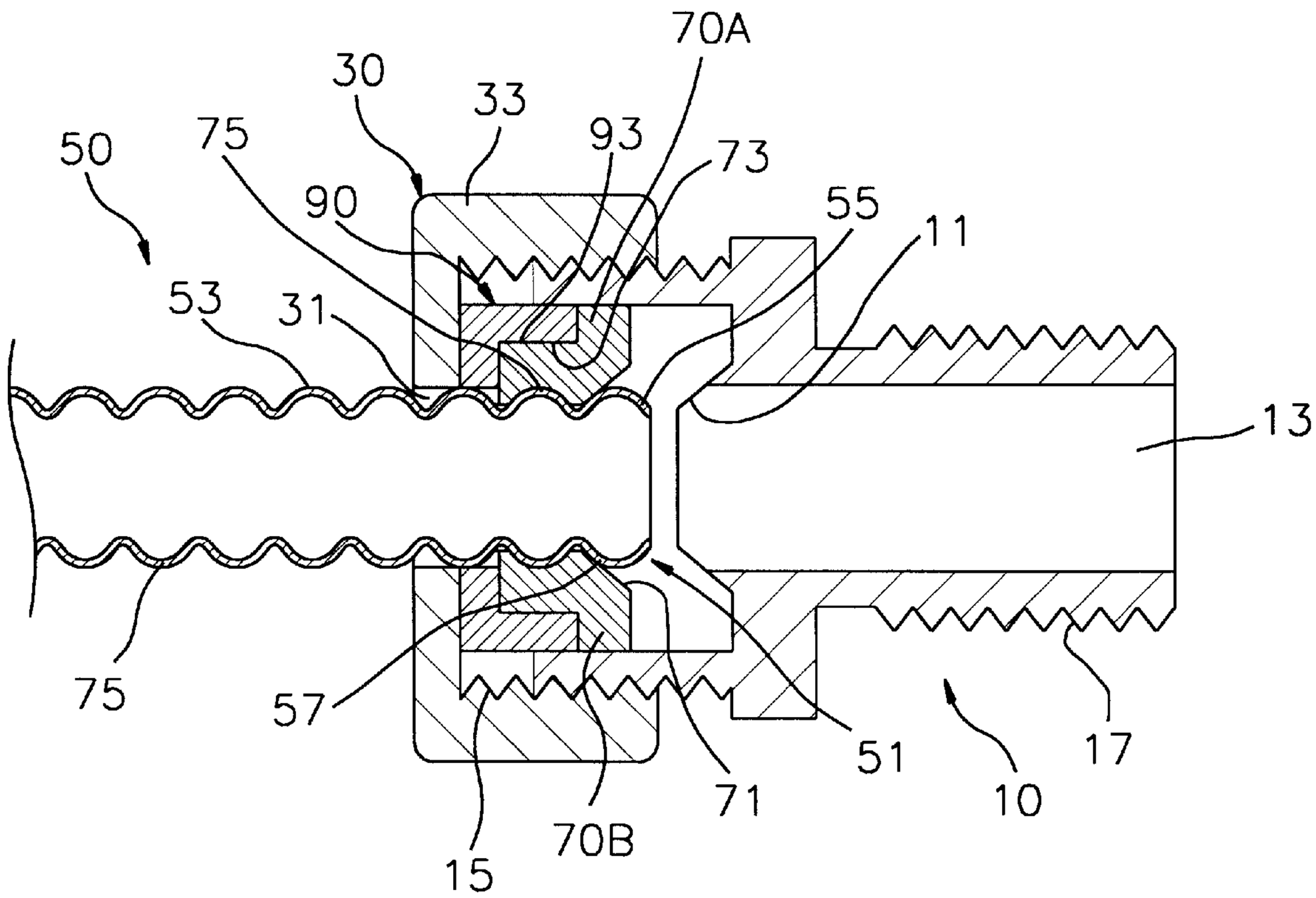


FIG. 1

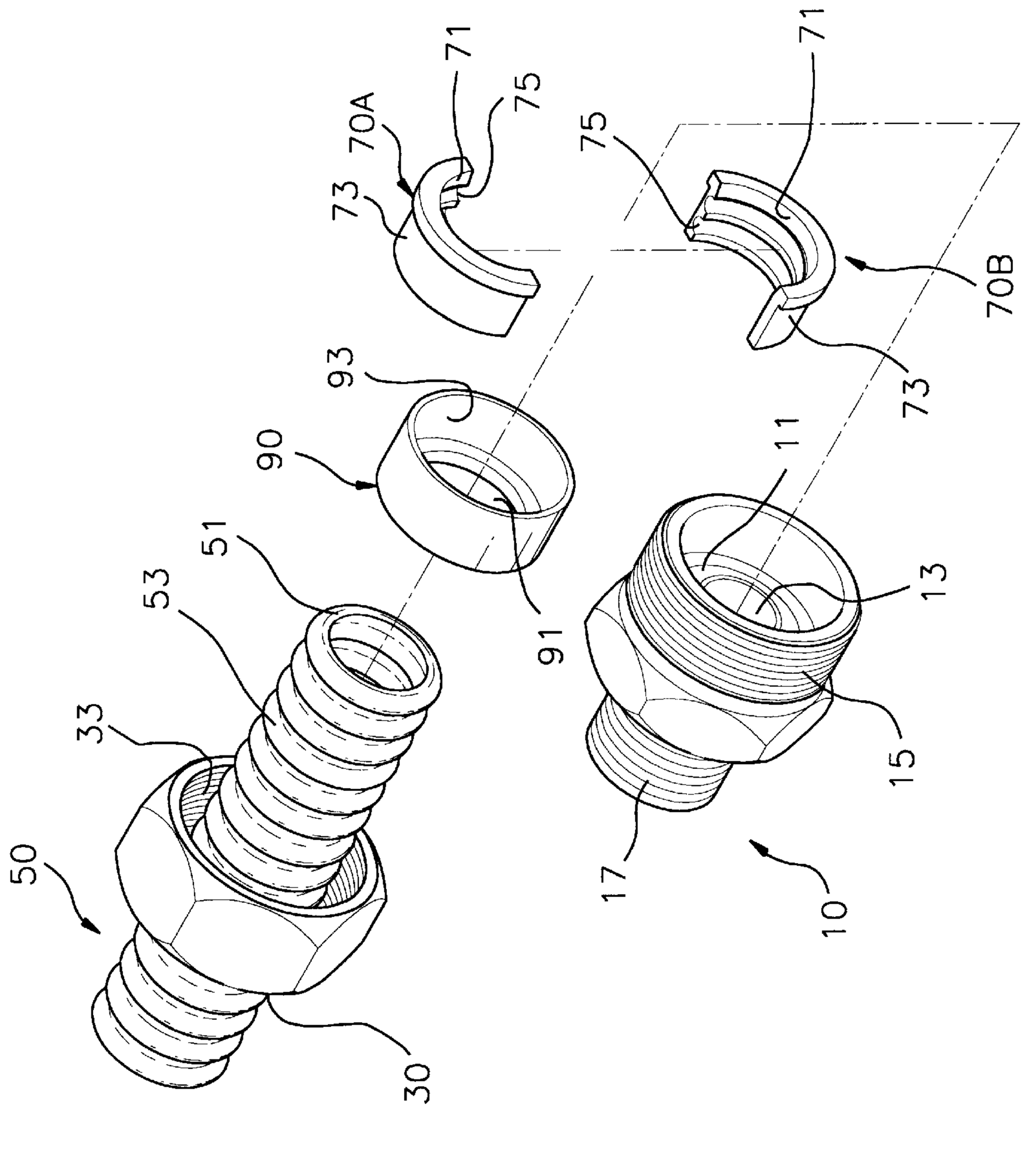


FIG.2

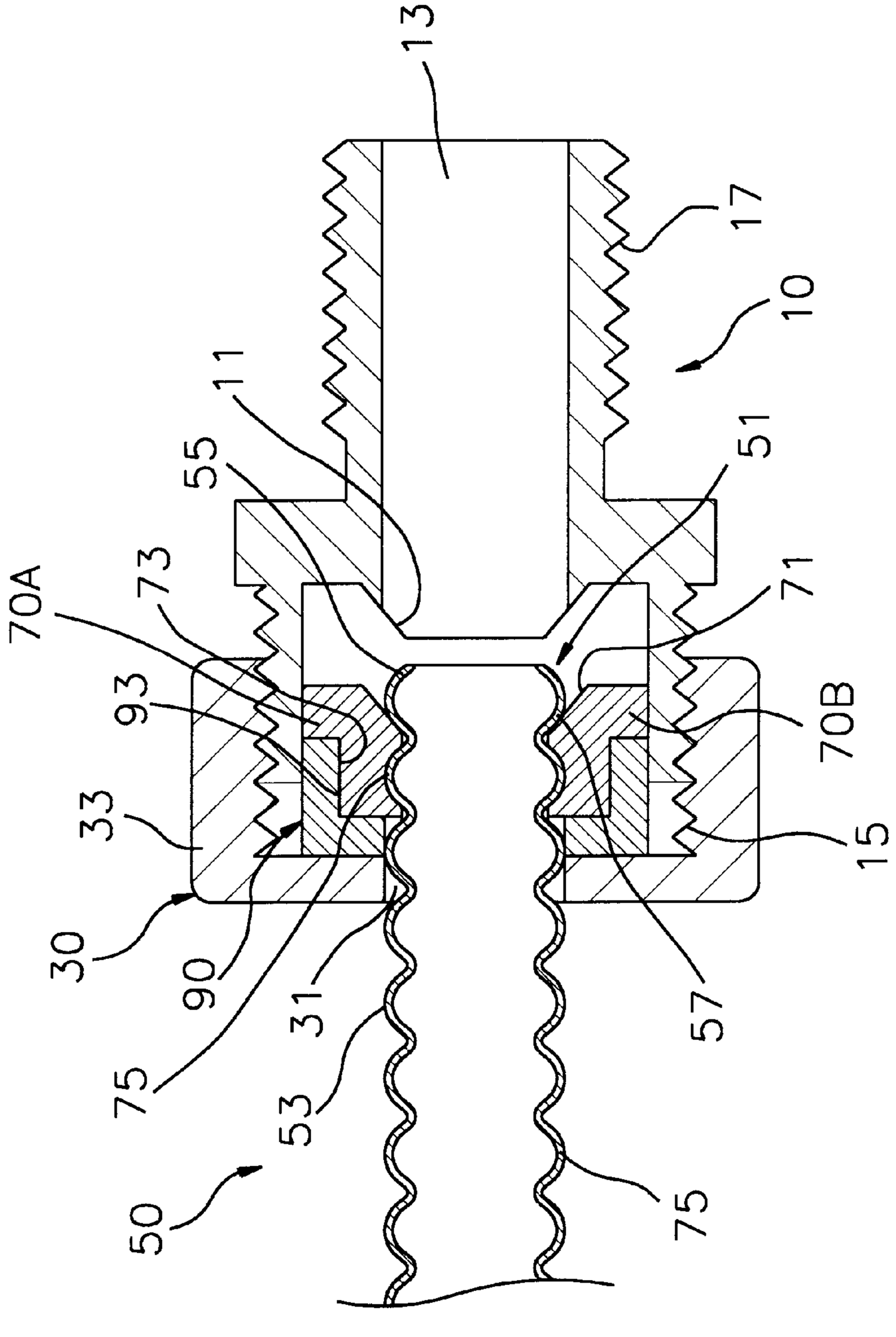


FIG.3

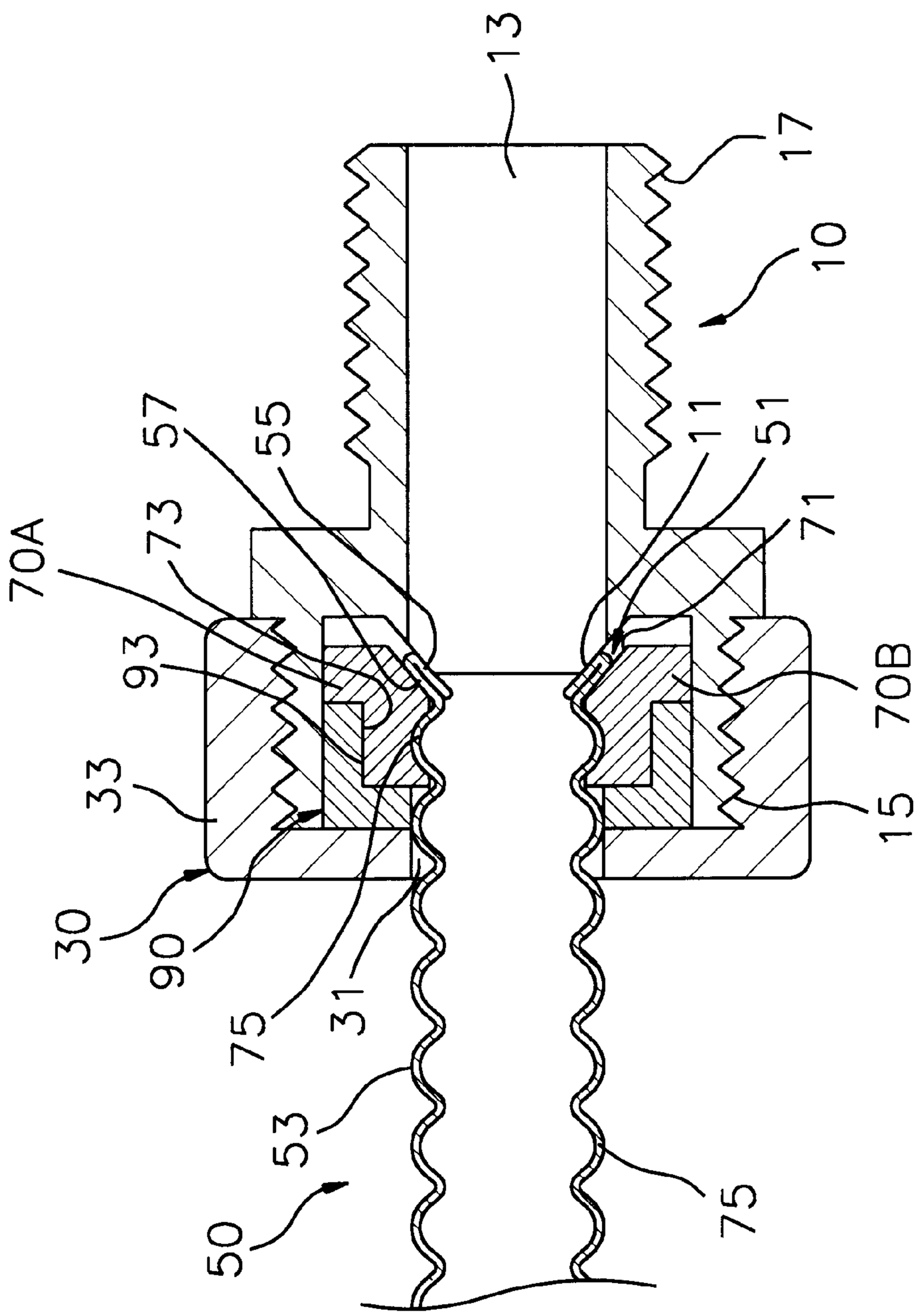


FIG. 4
PRIOR ART

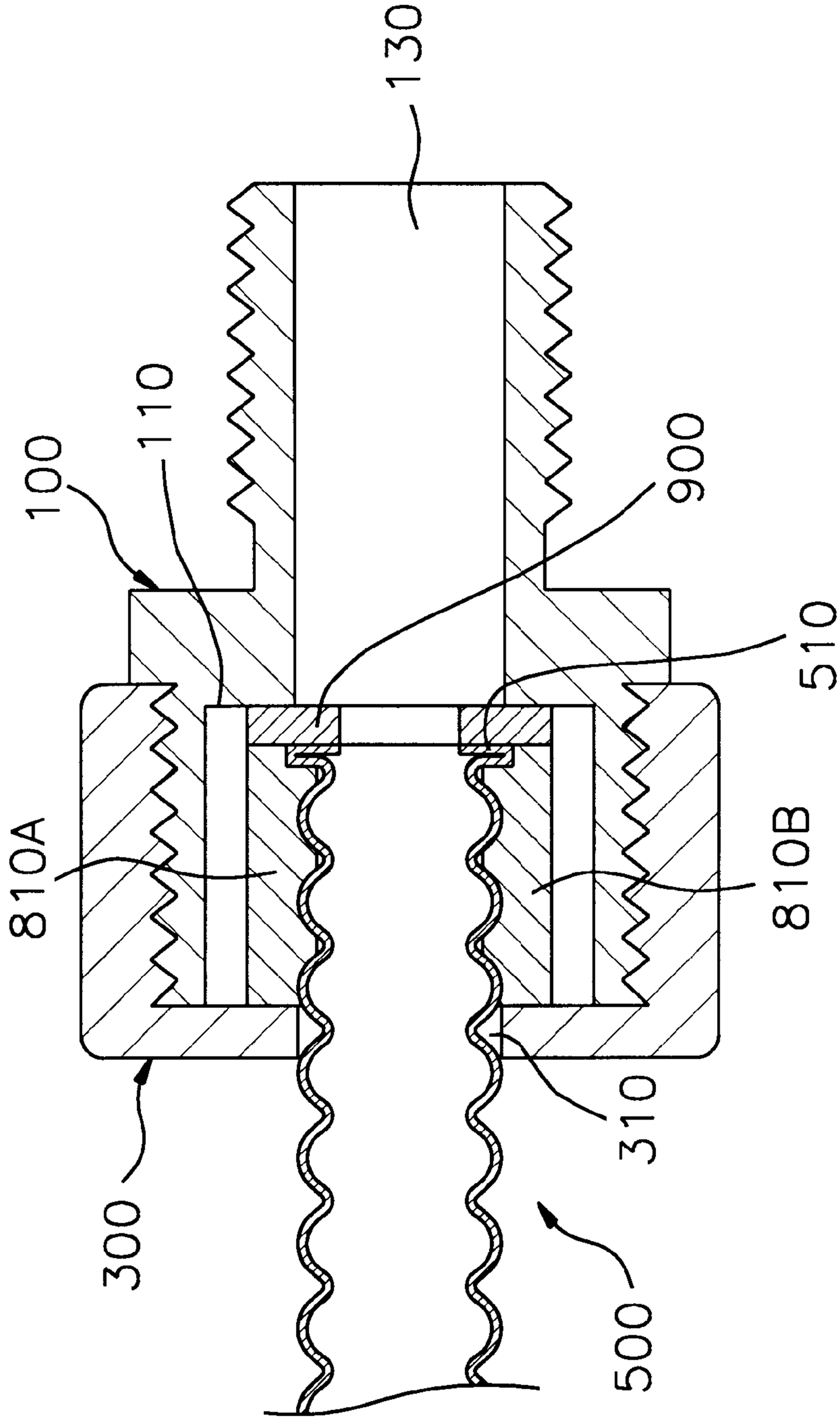
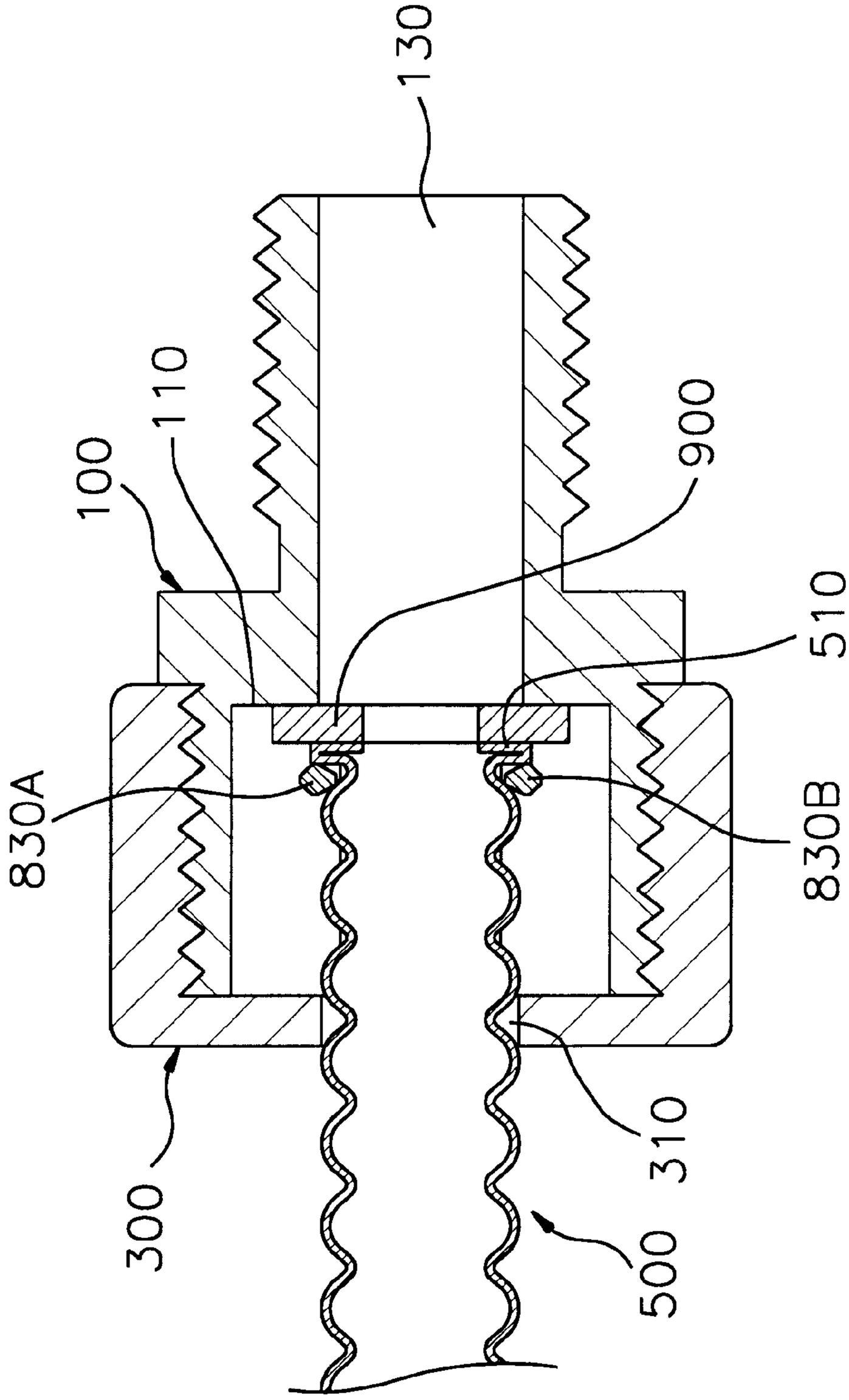


FIG.5
PRIOR ART



CONNECTOR FOR METAL RIBBED PIPE

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to a connector for a metal ribbed pipe, more particularly a connector for a metal ribbed pipe having a plurality of inserts being encompassed by a sleeve housed in a nut.

2. Prior Art

A sealable connector is required for a ribbed pipe through which high temperature or high pressure fluid flows in order to connect to a fluid receiving apparatus. A conventional connector for a metal ribbed pipe to satisfy this need is shown in FIGS. **4** and **5**.

As shown in these Figures, the connector for a metal ribbed pipe comprises an adapter **100** connecting a fluid receiving apparatus which is not shown, a ribbed pipe **500** inserted into a second through hole **310** of a nut **300**, and a pair of ferrules **810**A, **810**B, **830**A, **830**B housed in the nut **300** and mounted on the ribbed pipe **500** adjacent to a connecting end **510** of the ribbed pipe **500**. The connector for the metal ribbed pipe further comprises a rubber seal **900** arranged between the connecting end **510** and a flat portion **110** formed at a circumference of a fluid flow channel **130** of the adapter **100** to prevent the fluid from leaking from a connecting portion between the adapter **100** and the nut **300**.

The assembly of the conventional connector for a metal ribbed pipe configurated above will be made as follows: A pair of ferrules **810**A, **810**B, **830**A, **830**B are placed on the ribbed pipe **500**. The nut **300** moves along the ribbed pipe **500** toward the adapter **100**, and couples by being threaded with the adapter **100**. The ferrules **810**A, **810**B, **830**A, **830**B press the connecting end **510** of the ribbed pipe **500** with the further rotation of the nut **300**. The connecting end **510** pushes the rubber seal **900**, thereby completing the assembly.

To assemble the nut **300** with the adapter **100**, a worker holds the ferrules **810**A, **810**B, **830**A, **830**B mounted on the ribbed pipe **500** by one hand, and rotates the nut **300** by another hand. However, during the assembly process, the ferrules **810**A, **810**B, **830**A, **830**B drop off the ribbed pipe **500**, which leads to inconvenience during assembly work.

Further, if high temperature fluid flows through the ribbed pipe **500**, the efficient functioning of the rubber seal **900** declines over long term use.

Furthermore, if the fluid in the ribbed pipe **500** has a poisonous component, the use of the rubber seal **900** is nearly impossible.

THE SUMMARY OF THE INVENTION

The object of this invention is to provide a connector for a metal ribbed pipe for solving the above problems.

Another objective of this invention is to provide a connector for a metal ribbed pipe to eliminate the possiblity of dropping of a ferrule from a ribbed pipe during assembly of an adapter with a nut.

Another objective of this invention is to provide a connector for a metal ribbed pipe for extending the durability of a metal ribbed pipe as well as a connector for a metal ribbed pipe even when the transfer of poisonous fluid occurs.

To obtain these objectives, a connector for a metal ribbed pipe comprises a ribbed pipe for supplying fluid, an adapter having a fluid flow channel therein and connecting to an apparatus into which the fluid is supplied, a plurality of

inserts mounted on an outside surface of a connecting end of the ribbed pipe and having a collar respectively, a sleeve placed around the ribbed pipe and fitting on an outside diameter of each collar of the insert, and a nut for assembling the sleeve with the adapter.

Further, the adapter has a protrusion around the fluid flow channel, and the insert has a recess which is shaped to correspond with the protrusion of the adapter for closely contacting with the protrusion of the adapter.

Furthermore, the connecting end of the ribbed pipe flares in due to the close contact between the protrusion of the adapter and the recess of the insert during assembly of the adapter with the nut.

BRIEF DESCRIPTION OF THE DRAWINGS

This invention will be better understood and its various objects and advantages will be more fully appreciated from the following description taken in conjunction with the accompanying drawings, in which:

FIG. **1** is an exposed perspective view of a connector for a metal ribbed pipe according to a present invention,

FIG. **2** is a cross sectional view showing the inside arrangement of the connector at the preassembly stage according to the present invention,

FIG. **3** is a cross sectional view showing the inside arrangement of the connector at the tight assembly stage according to the present invention,

FIG. **4** is a cross sectional view showing the inside arrangement of the conventional connector according to one embodiment, and

FIG. **5** is a cross sectional view showing the inside arrangement of the conventional connector according to another embodiment.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Hereinafter, this invention will be described in detail with reference to the drawings.

FIG. **1** shows a connector for a metal ribbed pipe according to the present invention.

The connector for a metal ribbed pipe comprises a ribbed pipe **50** for supplying fluid, an adapter **10** for connecting to an apparatus into which the fluid is supplied, and a nut **30** for assembling the ribbed pipe **50** with the adapter **10**.

The connector for a metal ribbed pipe further comprises a plurality of inserts **70**A,**70**B and a sleeve **90** which are housed in the nut **30** and enable the nut **30** to be sealingly assembled with the adapter **10**.

The adapter **10** comprises a fluid channel **13** formed in the adapter **10** for supplying the fluid through the ribbed pipe **50** toward the fluid receiving apparatus (not shown), a second male thread portion **17** narrowing down as it extends toward the non-shown fluid receiving apparatus and connecting to the fluid receiving apparatus (not shown) directly, or indirectly via another adapter (not shown). The adapter **10** further comprises a first male thread portion **15** provided opposite to the second male thread portion **17** and coupling with the nut **30**. The adapter **10**, furthermore, comprises an annular protrusion **11** formed around the circumference of the fluid flow channel **13** which is adjacent to the inside of the first male thread portion **15** and enabling a recess **71** of the insert **70***a*,**70**B which will be illustrated later to be contacted.

The nut **30** comprises a second through hole **31** which is formed at a center of the nut **30** and through which the ribbed

pipe **50** is inserted, and a female thread portion **33** that is coupled by being thread with the first male thread portion **15** of the adapter **10**.

A pair of inserts **70**A,**70**B are shaped in a half-circle, respectively. Each insert **70**A,**70**B has a groove **75** at the inner circumference of the insert **70**A,**70**B which is placed on a rib **53** of the ribbed pipe **50**. Moreover, each insert **70**A, **70**B has a recess **71** at the portion facing the protrusion **11** of the adapter **10** with a complimentary shape having a shape of the protrusion **11**. Furthermore, the recess **71** has a collar **73** at the rear outer circumference of each insert **70**A,**70**B which is opposite to a front portion, where the recess **71** is formed, of each insert **70**A,**70**B.

The sleeve **90** comprises a first through hole **91** which is formed at a center of the sleeve **90** and through which the ribbed pipe **50** is inserted, and an annular flange **93** enabling each collar **73** of the assembled insert **70**A,**70**B to be inserted into the inner circumference of the annular flange **93**.

The ribbed pipe **50** comprises a connecting end **51** which contacts with the protrusion **11** of the adapter **10**, and a plurality of ribs **53** formed along the entire pipe.

An assembly of the inventive connector for the metal ribbed pipe is achieved as follows:

FIG. **2** shows the connector for a ribbed pipe in the preassembly step. The ribbed pipe **50** is introduced into the second through hole **31** of the nut **30**. Since the diameter of the second through hole **31** of the nut **30** is slightly larger than the outer diameter of the rib **53** of the ribbed pipe **50**, the nut **30** freely moves along the entire pipe. Following the nut **30**, the connecting end **51** of the ribbed pipe **50** is introduced into the first through hole **91** of the sleeve **90**. Since the diameter of the first through hole **91** of the sleeve **90** is slightly larger than the outer diameter of the rib **53** of the ribbed pipe **50**, the sleeve **90** also freely moves along the entire pipe.

Each insert **70**A,**70**B is placed on the rib **53** of the ribbed pipe **50** through which the sleeve **90** and the nut **30** are inserted already. The recess **71** of each insert **70***a*,**70**B comes into contact with the outer circumference of the connecting end **51** of the ribbed pipe **50**.

The sleeve **90** which freely moves along the ribbed pipe **50** moves toward the connecting end **51** of the ribbed pipe **50**. The inner circumference of the annular flange **93** of the sleeve **90** encompasses the collar **73** of each insert **70**A,**70**B. Since the outer diameter of the collar **73** is slightly larger than the inner diameter of the annular flange **93**, the sleeve **90** is forcedly fitted with the collar **73** of the assembled insert **70***a*,**70**B.

FIG. **3** shows circumferential edge **55** of the connecting end **51** of the ribbed pipe **50** comes into contact with the protrusion **11** of the adapter **10**. The nut **30** is thread with the first male thread portion **15** of the adapter **10**. With the further rotation of the nut **30**, the sleeve housed in the nut **30** pushes each insert **70**A,**70**B toward the adapter **10**. The recess **71** of each insert **70**A,**70**B pushes a sloped portion **57** of the ribbed pipe **50** toward the protrusion **11** of the adapter **10**. The sloped portion of the ribbed pipe **50** is formed next to the connecting end **51** of the ribbed pipe **50** toward the body of the ribbed pipe **50**. Simultaneously, the circumferential edge **55** of the ribbed pipe **50** flares in upon contact with the protrusion **11** of the adapter **10**. With the further rotation of the nut **30**, the outside surface of the connecting end **51** of the ribbed pipe **50** attains a sealed contact with the protrusion **11** of the adapter **10**, while the inside surface of the connecting end **51** is deformed adjacently by facing the slope portion **57** of the ribbed pipe **50**.

Since a pair of inserts are mounted on the rib of the ribbed pipe and fixedly coupled by the sleeve, and only the nut moves toward the adapter to be thread and coupled with the adapter, the ribbed pipe can speedily and properly be assembled with the adapter unless the insert drops from the ribbed pipe.

Further, since there is no need to employ a rubber seal which is provided between the ribbed pipe and the adapter for maintaining a seal, the connector for a metal ribbed pipe can be used to transfer even poisonous fluid with durability.

While this invention has been particularly shown and described with reference to particular embodiments thereof, it will be understood by those skilled in the art that various changes in form and details may be effected therein without departing from the spirit and scope of the invention as defined by the appended claims.

What is claimed is:

1. A connector for a metal ribbed pipe comprising:

a ribbed pipe for supplying fluid;

an adapter having a fluid flow channel therein and having a protrusion around said fluid flow channel and connecting with an apparatus into which the fluid is supplied;

a plurality of inserts mounted on an outside surface of a connecting end of said ribbed pipe and having a collar, respectively, each of said inserts having a recess which is shaped to correspond with said protrusion of said adapter for closely contacting with said protrusion of said adapter;

a sleeve placed around said ribbed pipe, said sleeve has a first through hole which is formed at a center thereof and through which the ribbed pipe is inserted and an annular flange enabling each collar of the inserts being assembled to be inserted into the inner circumference of the annular flange, for being forcedly fitted with said collar of said inserts being assembled and fitting on an outside diameter of each collar of said inserts; and

a nut for assembling said sleeve with said adapter.

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